Inclusive and sustainable industrial development platform/SDG9 indicators: challenges in aggregating economic, environmental and social indicators into synthetic indices.

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Structure of the presentation

• 1. The importance of the inclusive and sustainable industrial development (ISID) concept for UNIDO.
• 2. ISID indicators: scoreboard approach
• 3. Aggregating ISID indicators: the problem of composite indices
• 4. Experimenting new ISID indices
1. The importance of the inclusive and sustainable industrial development (ISID) concept for UNIDO.
The UNIDO concept of inclusive and sustainable industrial development (ISID)

ISID “enhances and reinforces economic growth and diversification in a socially inclusive and environmentally sustainable manner, guided by four overarching principles:

- **No one is left behind** in benefiting from industrial growth and **prosperity is shared among all parts** of the society as industry creates the wealth needed to address critical social and humanitarian needs;
- **Every country is able to achieve a higher level of industrialization** in their economies, and benefits from the globalization of markets for industrial goods and services;
- **Broader economic and social progress is supported within an environmentally sustainable** framework”;

Source: https://isid.unido.org/
ISID is reflected in to the Sustainable Development Goal 9

SUSTAINABLE DEVELOPMENT GOAL 9
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
2. ISID indicators: scoreboard approach
Inter-Agency and Expert Group on Sustainable Development Goal Indicators

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry’s share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capacities

9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities

9.1.1 Share of the rural population who live within 2 km of an all-season road

9.1.2 Passenger and freight volumes, by mode of transport

9.2.1 Manufacturing value added as a percentage of GDP and per capita

9.2.2 Manufacturing employment as a percentage of total employment

9.3.1 Percentage share of small-scale industries in total industry value added

9.3.2 Percentage of small-scale industries with a loan or line of credit

9.4.1 CO₂ emission per unit of value added

9.5.1 Research and development expenditure as a percentage of GDP

9.5.2 Researchers (in full-time equivalent) per million inhabitants

9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure

9.b.1 Percentage of medium and high-tech industry value added in total value added
How to measure and how to set SDG 9 targets?

**Italy**
High Income, Europe, Industrialized Economies

<table>
<thead>
<tr>
<th>SDG 9 monitoring</th>
<th>2017</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing value added as a proportion of GDP, total (%)</td>
<td>14.4</td>
<td>-</td>
</tr>
<tr>
<td>Manufacturing value added per capita, total (constant 2010 United States dollars)</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Manufacturing employment as a proportion of total employment, total (%)</td>
<td>18.2</td>
<td>-</td>
</tr>
<tr>
<td>Proportion of small-scale industries in total industry value added, total (%)</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>Proportion of small-scale industries with a loan or line of credit, total (%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Carbon dioxide emissions from manufacturing industries (millions of tonnes)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Carbon dioxide emissions per unit of Manufacturing Value Added, total (kilogrammes of CO2 per constant 2010 United States dollars)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Proportion of medium and high-tech industry value added in total value added, total (%)</td>
<td>42.7</td>
<td>-</td>
</tr>
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</table>
3. Aggregating ISID indicators: the problem of composite indices
The need of ISID composite indices

How to measure trade offs? How to evaluate if negative impacts of ISID indicators are compensated by positive impacts?
The UNIDO Competitive Industrial Performance Index

First dimension: Capacity to produce & export manufactures

- Indicator 1: MVApC
  Manufacturing Value Added per Capita
- Indicator 2: MXpc
  Manufacturing Export per Capita

Second dimension: Technological deepening and upgrading

- Composite (Indicators 3-4): Industrialization Intensity
  \[ \text{INDInt} = \frac{\text{MHVAsh} + \text{MVAsh}}{2} \]
- Composite (Indicators 5-6): Export Quality
  \[ \text{MXQual} = \frac{\text{MHXsh} + \text{MXsh}}{2} \]

Third dimension: World Impact

- Indicator 7: ImWIMVA
  Impact of a country on World MVA
- Indicator 8: ImWMT
  Impact of a country on World Manufactures Trade
Monitoring industrial performance. The Morocco case
Ideally an ISID index..

• 1) An ISID index is based on a solid definition/idea. Not well defined ideas are often not reflected into a well-defined index;

• 2) An ISID index includes at least an economic indicator, an environmental indicator and a social indicator to represent the three dimensions of sustainability;

• 3) The ISID index should be designed in such a way that increases in each single dimension of sustainability are reflected into an increase of ISID;

• 4) If possible, and without compromising the cost effectiveness of the ISID index creation and monitoring, the equal weight bias and the perfect substitutability bias should be dealt with.

• 5) Data coverage should include OECD and non OECD countries across over time and when feasible, data should allow comparisons vis a vis the best international standards, even when the index is based on simple regions of a country. Detailed sectorial aggregation of industry could also be a desirable to qualify the different typologies of industrialization.
Mitigating the equal weights and perfect substitutability bias
4. Experimenting new ISID indices
A starting path: the UNIDO platform of ISID and green industry composite indices

**ISID indices for green industry**

- **The CGDI index** analyzes performance in economic and environmental indicators of China regions green development, a development balancing economic and environmental performance.

- **The GIP index** analyzes at international level how green sectors contribute to economic development in terms of MVA and employment and the CO2 emissions impact of industry.

- **The Giper/Gipro index** analyze how regions in China are performing or progressing towards higher levels of MVA and employment in low energy intensive sectors and towards industrial environmental indicators.

- **ISID index** analyzes at international level and national level how countries maximize MVA by minimizing total CO2 emissions and income inequality.

**The UNIDO CIP (Competitive Industrial Performance) index** measures industrial performance of countries.

**ISID** is a tool for creating jobs, for building more equitable societies, and for safeguarding the environment, while sustaining economic growth.

**ISID**

- To what extent are regions reaching green development?
- To what extent countries are driving structural change towards environmental friendly/green goods and sectors?
- To what extent countries are able to industrialize by minimizing negative social and environmental impacts?

**ISID and SDG9 challenges**

- To what extent can firms be considered green?
- To what extent are countries simultaneously progressing/performing in economic, environmental and social aspects of industrialization?

**The Green Performance Ranking** analyzes performance in environmental indicators of China firms in 20 different categories of benchmarks based on geographical criteria (local, national, international) and performance.

**The SDG9 progress index** analyzes at international level how countries are simultaneously progressing towards higher levels of SDG9 indicators.

**The SDG9 index** analyzes at international level how countries are simultaneously performing towards higher levels of SDG9 indicators.
The Data Envelopment Analysis approach

• How can DEA be a desirable approach?
  • It yields most favorable, country-specific weights, it may help to mitigate arbitrary/equal weight and perfect substitutability bias
  • It upholds the objectivity of policy benchmarking and prescription

• What is DEA exactly? DEA in a nutshell
  • An algorithm minimizing “bad” to achieve the same level of “good”
    • What is “bad”? CO2 emission and income inequality
    • What is “good”? Manufacturing performance
    • This “inputs orientation” approach is based on a set of country specific constraints
# Two formulations of an ISID index

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>ISID best possible measurement</th>
<th>Official SDG 9 measurement</th>
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<tbody>
<tr>
<td>Manufacturing performance</td>
<td>Manufacturing value added per capita (US$)</td>
<td>Manufacturing value added per capita (US$)</td>
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<tr>
<td>Social inclusiveness</td>
<td>GINI inequality ratio (net, disposable income)</td>
<td>Manufacturing employment gap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Manufacturing share (sample max) - Manufacturing share]</td>
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<tr>
<td>Environmental sustainability</td>
<td>CO2 emission (kt) per capita</td>
<td>Manufacturing CO2 intensity</td>
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<tr>
<td></td>
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<td>(CO2, kg / MVA US$ 2010 constant)</td>
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The SDG9 index ranking

<table>
<thead>
<tr>
<th>SDG 9 2015</th>
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<tbody>
<tr>
<td>Czech Republic, Switzerland – 1</td>
<td>Republic of Korea – 8</td>
<td>Kyrgyzstan – 114</td>
</tr>
<tr>
<td>Germany – 3</td>
<td>Italy – 12</td>
<td>Iraq – 115</td>
</tr>
<tr>
<td>Japan – 4</td>
<td>Malaysia – 36</td>
<td>Ethiopia – 116</td>
</tr>
<tr>
<td>Ireland – 5</td>
<td>China – 51</td>
<td>Nepal – 117</td>
</tr>
<tr>
<td>Austria – 6</td>
<td>Morocco – 77</td>
<td>Syria – 118</td>
</tr>
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Explaining the ISID SD9 index
Policy implications from an ISID index approach

Targeting efficient frontier or comparator?
Benchmarking could also be a political decision

Objective policy benchmarking ("targeting frontier")
Thanks!